long concentrated his attention chiefly on reptiles and amphibians, and the orders of those classes admitted by him are trenchantly separated by well-marked osteological characters. When he entered the ichthyological field he found that orders generally recognized in that class had not the same morphological value as the reptilian ones, and naturally groped around till he conceived he found a corresponding one in the group generally ranked as a subclass—Teleostei. The American naturalists took the orders as they found them left by their predecessors in the field, but a little examination and comparison showed that differences manifest within each of the large orders were of even greater morphological value than those used to differentiate the old orders. Some of those orders were consequently much contracted, as the Malacopterygii, Apodes, Anacanthini, Acanthopterygii and Plectognathi, and types ejected therefrom were set apart as of equal value, such as the Nematognathi, Plectospondyli, Symbranchii, Heteromi, Opisthomi, Pediculati and others. While these may not compare with the reptilian orders, they do with the mammalian and avian. One who has derived his knowledge of the orders of mammals and birds from a comparative examination of their skeletal features, and not from definitions in books alone, must admit that the average orders of mammals are not of greater morphological importance than the orders or 'suborders' of fishes, and that most of the orders of birds are of much less value. Likewise are the most contracted families of fishes of greater morphological value than most of those of birds—especially the Oscine birds—and of as great importance as the majority of those of mammals. A desire to establish for the fishes groups comparable with those adopted by the numerous students of birds and mammals has led American students to the narrow limitations of groups manifest in their works. The contrary method isolates ichthyology and gives a false or distorted idea of the significance of the terms order, family and genus. An expression of hope may be pardoned, therefore, that inasmuch as a long established standard for comparison has been adopted by many ichthyologists, others may in time recognize the propriety of accepting such a standard themselves.

The consideration of other differences must be left to other times and other places. Meanwhile we may congratulate European naturalists that the incubus which has long depressed ichthyology in the old world has been, to some extent at least, lifted, and that investigation may now be so directed that it will be profitable to systematic development. It was a bad and unscientific method that has paralyzed science in Europe for these many years, and let us hope that the new work may force it far into the background, if not wholly eradicate it. Let it be distinctly understood that the only sound foundation for scientific ichthyology is a profound *comparative* anatomy, and especially osteology of all the genera. This truth has long been recognized in the United States by some investigators, but it has not yet been appreciated by our museum authorities and in that respect the investigators of the old world and especially of London will for the present have a great advantage over Americans. We may envy our European colaborers, but shall be glad, nevertheless, to admire and avail ourselves of their superior advantages. We shall be grateful, also, for the new light which the coauthors of the 'Cambridge Natural History,' and especially Dr. Boulenger, have thrown and will continue to throw on mooted questions of morphology and classification. We thank them now. THEO. GILL.

SCIENTIFIC JOURNALS AND ARTICLES.

THE March number of the *Botanical Gazette* contains the following papers: John M. Coulter and W. J. G. Land give an account of the gametophytes and embryo of *Torreya taxifolia*, a species localized in eastern Florida, and closely related to *Taxus*. The type seems to be specialized rather than primitive, with a solitary archegonium, remarkably early fertilization, and no 'open cells' in the proembryo. The peculiar 'rumination' of endosperm proves to be due to the irregular encroachment of endosperm upon perisperm. Pehr Olsson-Seffer discusses the principles of phy-

togeographic nomenclature, urging the gradual evolution of terminology rather than its rigid prescription. Harry N. Whitford continues his discussion of the forest of Flathead valley, Montana. J. C. Arthur suggests a set of simple terms for the spore structures in the Uredinales, whose confused terminology is at present extremely perplexing.

THE contents of the *Journal of Comparative Neurology* for March are as follows:

IRVING HARDESTY: 'Observations on the Spinal Cord of the Emu and its Segmentation.' With four figures.

S. J. HOLMES: 'The Selection of Random Movements as a Factor in Phototaxis.'

WALTER C. JONES, M.D.: 'Notes on the Development of the Sympathetic Nervous System in the Common Toad.' With twelve figures.

Editorial:—Concerning the Genetic Relations of Types of Action. The Basis for Taxis and Certain Other Terms in the Behavior of Infusoria. The Problem of Instinct.

ISADOR H. CORIAT: 'A Review of Some Recent Literature on the Chemistry of the Central Nervous System.'

SOCIETIES AND ACADEMIES.

THE GEOLOGICAL SOCIETY OF WASHINGTON.

THE 165th meeting was held March 8, with President Merrill in the chair. The regular program included:

Genesis of Ore Deposits at Bingham, Utah: J. M. BOUTWELL.

Three types of ore were described: (1) lead-silver ore in lodes, (2) auriferous copper ore disseminated in monzonite and (3) bedded pyritous copper ore in marbleized limestone. The lode ores are believed to have been transported by heated solutions which ascended from a deep-lying magma along northeast-southwest fissures, and to have been deposited mainly by filling, partially by replacement. The disseminated ore was shown to have been formed at a period subsequent to the date of intrusion, partly from the original constituents of the monzonite and partly from copper, gold and other elements introduced by highly heated solutions or vapors. The immense lenticular beds of pyritous copper ore were formed by molecular replacement of contact metamorphosed limestone, partly from elements emitted by the intrusives contemporaneous with their intrusion and partly by subsequent additions from deep-lying portions of the magma after the superficial portions had at least partially solidified. Since these two periods of ore deposition the primary sulphides have been enriched by superficial alteration to oxides, carbonates, sulphates and secondary black sulphides. The complete report on this district which has been prepared by Mr. S. F. Emmons, Mr. A. Keith and Mr. J. M. Boutwell, is now in press and will appear shortly as Professional Paper No. 38.

The Subterranean Gases of Cripple Creek: WALDEMAR LINDGREN.

A brief account was given of the gases which issue in some of the Cripple Creek mines and which as a rule were not encountered until a point below the zone of oxidation was reached. These gases interfere greatly at times with the work of those mines in which they appear and several deaths have been caused by them. It was found that the amount fluctuates according to the stand of the barometer. At low barometer it issues plentifully from the fissures and the porous rocks, and may fill the mine up to the collar. With high barometer the gas disappears and the change may take place very suddenly. The gas as a rule is heavy and accumulates in winzes and shafts. Its temperature appears to be somewhat higher than that normally prevalent in the mine. It was soon found that the amount of carbon dioxide, of which the gas was believed to consist, was entirely inadequate to produce the effects noticed, and analyses show that a great excess of nitrogen is present. A sample from the Conundrum mine was kindly analyzed by the department of chemistry at Cornell University, with the following result:

CO_2	10.22
O	5.7
N	84.1

Mr. W. H. Weed presented a paper on 'An Asphalt Lake near Tampico, Mexico.'

GEO. OTIS SMITH,
Secretary.